The Cirripedia (Crustacea) collected by the RV *Marion Dufresne* along the Vitória-Trindade seamounts (Brazil)

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ABSTRACT
The cirripeds sampled by the *Marion Dufresne* in 1987 from the Vitória-Trindade seamounts (20°S, Brazil) and from depths down to 3442 meters include thirteen species: nine lepadomorphs, two verrucomorphs, and two balanomorphs. Among these are two new species: *Scillaelepas rhabdota* n. sp. and *Scillaelepas brasiliensis* n. sp. *S. rhabdota* n. sp. has the capitular plates with strong, radial striae, the tergum has a straight apex and the rostrum is evenly curving. *Scillaelepas brasiliensis* n. sp. has the capitular plates with fine, radial striae and with a medial ridge, the tergum has the scutal surface smaller than carinal. Six species are new records from the southwestern Atlantic: *Poecilasma aurantia* Darwin, 1852, *Glyptelasma carinatum* (Hoek, 1883), *Neoscalpellum debile* (Aurivillius, 1898), *Trianguloscalpellum regium* (Wyville Thomson, 1873), *Amigdoscalpellum aurivilli* (Pilsbry, 1907), and *Metaverruca recta* (Aurivillius, 1898).

KEY WORDS
Cirripedia,
Thoracica,
new species,
Brazil,
southwestern Atlantic Ocean.

RÉSUMÉ
Les cirripèdes (Crustacea) récoltés par le Marion Dufresne *au long des monts sous-marins de la chaîne Vitória-Trindade (Brésil).*
Treize espèces de cirripèdes, dont neuf lépadomorphes, deux verruco-morphes et deux balanomorphes, ont été récoltées au large de la côte sud-est brésilienne lors d'une campagne du *Marion Dufresne*, en 1987, consacrée à la faune profonde et à celle des monts sous-marins de la chaîne Vitória-Trindade (20°S). Deux espèces nouvelles sont décrites : *Scillaelepas rhabdota* n. sp. et *Scillaelepas brasiliensis* n. sp. *S. rhabdota* n. sp. se distingue par les fortes crêtes radiales des plaques capitulaires, par l'apex du tergum droit et le rostre incurvé. Chez *Scillaelepas brasiliensis* n. sp., les plaques capitulaires sont pourvues de stries radiales fines et d'une crête mediane, la surface scutale du tergum est plus petite que sa surface carinale. Six espèces sont recensées pour la première fois dans l'Atlantique sud-occidental : *Poecilasma aurantia* Darwin, 1852, *Glyptelasma carinatum* (Hoek, 1883), *Neoscalpellum debile* (Aurivillius, 1898), *Trianguloscalpellum regium* (Wyville Thomson, 1873), *Amigdoscalpellum aurivilli* (Pilsbry, 1907) et *Metaverruca recta* (Aurivillius, 1898).

MOTS CLÉS
Cirripedia,
Thoracica,
nouvelles espèces,
Brésil,
Atlantique sud-occidental.

INTRODUCTION

The RV *Marion Dufresne* dredged along the Vitória-Trindade seamounts (20°S) Brazil, from shallow waters down to 5155 m (Guille & Ramos 1988). Although the Brazilian continental shelf cirripeds are relatively well known (see references in Young 1998a: 263; Tavares 1999), there is only scattered information on the deep-sea species (Table 1).

The present study describes the cirriped species collected along the Vitória-Trindade seamounts from depths between 33 and 3442 m. The distribution of the species along the Brazilian coast is discussed.

The specimens studied are deposited in the Museu Nacional, Rio de Janeiro (MNRJ), Muséum national d'Histoire naturelle, Paris (MNHN) and Universidade Santa Úrsula (USU).

Abbreviations

tl total length;
re rostro-carinal diameter.

Specimens and station data for the material examined is as follows

For a map showing location of the oceanographic stations conducted by the *Marion Dufresne* in Southeastern Brazil, see Tavares (1999).

Stn 02 CP1, 23°04'S, 40°20'W, 2370-2380 m, *Metaverruca recta* (Aurivillius, 1898), *Coronula diadema* (Linnaeus, 1767); stn 04 CP07, 21°31.4'S, 40°06.8'W, 750-785 m, *Costatoverruca flavidula* (Pilsbry, 1916); stn 05 CP11, 21°35.17'S, 40°05.06'W, 248 m, *Poecilasma inaequilaterale* Pilsbry, 1907; stn 29 DC49, 20°43'S, 31°56'W, 944-945 m, *Scillaelepas rhabdota* n. sp., *Scillaelepas brasiliensis* n. sp., Balanomorpha unidentified species; stn 38 CP63, 19°01'S, 37°29'W, 3442-3420 m,

Table 1. — Cirripeds known from Brazil from depths below 100 m.
Ant, Antarctic; At, Atlantic Ocean; Co, cosmopolitan; In, Indian Ocean; Pa, Pacific Ocean; SWA, southwestern Atlantic; WA, western Atlantic; WP, western Pacific; (*) this report.

Species	South Atlantic distribution	Geographic distribution	Author
Heteralepas cornuta Darwin	31°S	Co	Young 1995
H. lankesteri (Gruvel)	8°S	WA	Nilsson-Cantell 1927
Poecilasma inaequilaterale Pilsbry	18°S to 32°S	WA	Young 1990; *
P. aurantia Darwin	21°S to 23°S	At	Young 1995 (as *P. kaempferi* Darwin); *
Glyptelasma carinatum (Hoek)	23°S	At, WP	*
Scillaelepas rhabdota n. sp.	20°S	SWA	*
S. *brasiliensis* n. sp.	20°S	SWA	*
Hamatoscalpellum rathbunae (Pilsbry, 1907)	23°S to 46°S	SWA	Young 1995
Litoscalpellum henriquecostai (Weber)	23°S to 31°S	SWA	Weber 1960; Young 1992, 1995
L. regina (Pilsbry)	8°S, 35°S	WA	Calman 1918; Young 1992
Neoscalpellum debile (Aurivillius)	19°S	At	*
Arcoscalpellum portoricanum (Pilsbry)	31°S	WA	Young 1992
A. triangulare (Hoek)	33°S to 38°S	SWA, Ant	Young 1992, 1995
Weltnerium aduncum (Aurivillius)	12°S to 23°S (inferred from host distribution)	SWA	Weltner 1898; Young 1995
Verum idioplax (Pilsbry)	23°S to 27°S	WA	Young 1995
Diceroscalpellum boubalocerus (Young)	22°S to 38°S	SWA	Young 1992, 1995
Trianguloscalpellum regium (Wyville Thomson)	19°S	At, ?Pa, ?In	*
Amigdoscalpellum aurivilli (Pilsbry)	18°S to 19°S	WA	*
Altiverruca gibbosa (Hoek)	24°S	Co	Young 1995
Costatoverruca caribbea (Pilsbry)	30°S to 33°S	WA	Young 1993, 1995
C. flavidula (Pilsbry)	8°S to 23°S	WA	Nilsson-Cantell 1927; *
Rostratoverruca nexa Darwin	23°S to 33°S	WA	Young 1993, 1995
Metaverruca recta (Aurivillius)	23°S	Co	*

Neoscalpellum debile (Aurivillius, 1898), *Trianguloscalpellum regium* (Wyville Thomson, 1873), *C. diadema*; stn 39 CP68, 18°55'S, 37°49'W, 1200-1500 m, *C. diadema*; stn 39 DC70, 18°59.1'S, 37°47.8'W, 1540-1550 m, *C. diadema*; stn 40 DC72, 19°00'S, 37°49'W, 950-1050 m, *C. diadema*; stn 42 DC75, 18°59'S, 37°50'W, 295 m, *C. diadema*; stn 42 CB76, 18°58'S, 37°49'W, 600-637 m, *P. inaequilaterale*, *Amigdoscalpellum aurivilli* (Pilsbry, 1907), *C. diadema*; stn 43 CB77, 19°00'S, 37°47'W, 900-790 m, *A. aurivilli*; stn 45 CB79, 19°01'S, 37°47'W, 1580-1575 m, *C. diadema*; stn 56 CB96, 21°31'S, 40°08'W, 300-295 m, *P. inaequilaterale*, *C. flavidula*, *Balanus venustus* Darwin, 1854; stn 60 CB100, 22°59'S, 42°06'W, 33-45 m, *Diceroscalpellum boubalocerus* n. comb. (Young, 1992); stn 60 CB100, 22°59'S, 42°06'W, 33-45 m, *B. venustus*; stn 60 CB101, 22°58'S, 42°06'W, 50 m, *B. venustus*; stn 61 CB102, 23°07'S, 23°07'W, 100 m, *B. venustus*; stn 64 CP105, 23°46'S, 42°09'W, 592-610 m, *Poecilasma aurantia* Darwin, 1854; stn 65 CB106, 23°54'S, 42°10'W, 830 m, *Glyptelasma carinatum* (Hoek, 1883), *C. flavidula*.

Order PEDUNCULATA Lamarck, 1818
Suborder LEPADOMORPHA Pilsbry, 1916
Family POECILASMATIDAE Annandale, 1909
Genus *Poecilasma* Darwin, 1852

Poecilasma inaequilaterale Pilsbry, 1907
(Fig. 1A, B)

Poecilasma inaequilaterale Pilsbry, 1907: 85, pl. 6, figs 6-8; 11-12. – Henry 1954: 444. – Zullo 1968: 214. – Weisbord 1979: 40, pl. 4, figs 1-3. – Young 1990: 650, fig. 5a-c; 1995: 239.
Trilasmis (*Poecilasma*) *kaempferi inaequilaterale*. – Pilsbry 1953: 13, pl. 1 fig. 1.
Trilasmis kaempferi inaequilaterale – Spivey 1981: 170.

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, *Marion Dufresne*, stn 5 CP11, 21°35'17"S, 40°05'06"W, 248 m, 9.V.1987, 1 specimen tl 12 mm (MNHN-Ci2818). — Stn 42 CB76, 18°58'S, 37°49'W, 600-637 m, 27.V.1987, 2 specimens tl 4 and 13 mm (USU 1322). — Stn 56 CB96, 21°31'S, 40°08'W, 300-295 m, 31.V.1987, over 200 specimens on *Libinia* sp. tl up to 16 mm (MNRJ 11397, USU 1323, MNHN-Ci2805).

REMARKS
The species of *Poecilasma* are difficult to identify because most of them do not have obvious diagnostic characters (Young 1999: 6).
The specimens of *P. inaequilaterale* have the height/width ratio of the capitulum less than that of *P. aurantia* (Fig. 1A). The scuta are asymmetrical (Fig. 1B) and their surfaces are regularly convex. There is only one straight apico-basal ridge, separating a narrow occludent region and a large convex region, dorsal to the apico-basal ridge (Fig. 1A).
P. inaequilaterale was described from the northwestern Atlantic (Pilsbry 1907: 85) and recorded from the Brazilian coast (Young 1990: 650, 1995: 230).

Poecilasma aurantia Darwin, 1852
(Fig. 1C, D)

Poecilasma aurantia Darwin, 1852: 105, pl. 2, fig. 2. – Young 1998b: 33 [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, *Marion Dufresne*, stn 64 CP105, 23°46'S, 42°09'W, 592-610 m, 2.VI.1987, 44 specimens tl up to 17 mm (MNRJ 11379), (USU 1324), (MNHN-Ci2806).

REMARKS
The present specimens have an almost symmetrical scutum (Fig. 1D). The apico-basal ridge forms a narrow occludent region. Another ridge extend from the umbo to the junction of the tergum and carina and separates the dorsal region of the plate into a flattened area between both ridges and another convex area near the carinal margin (Fig. 1C).
Mine specimens are similar to those observed from the Eastern Atlantic (Young 1999: 5). Some authors (Barnatd 1924: 51) consider *P. aurantia* synonymous with *P. kaempferi* Darwin, 1852 or even a variety of this (Gruvel 1902a: 31, 1905: 115; Zevina 1982: 98), which was described from Japan (Darwin 1852: 105). I reject both synonymies and retain for these specimens the name proposed for the Atlantic species. This is the first record of *P. aurantia* from the Western Atlantic. Several previous records of *P. kaempferi* from the Atlantic may actually refer to *P. aurantia*.

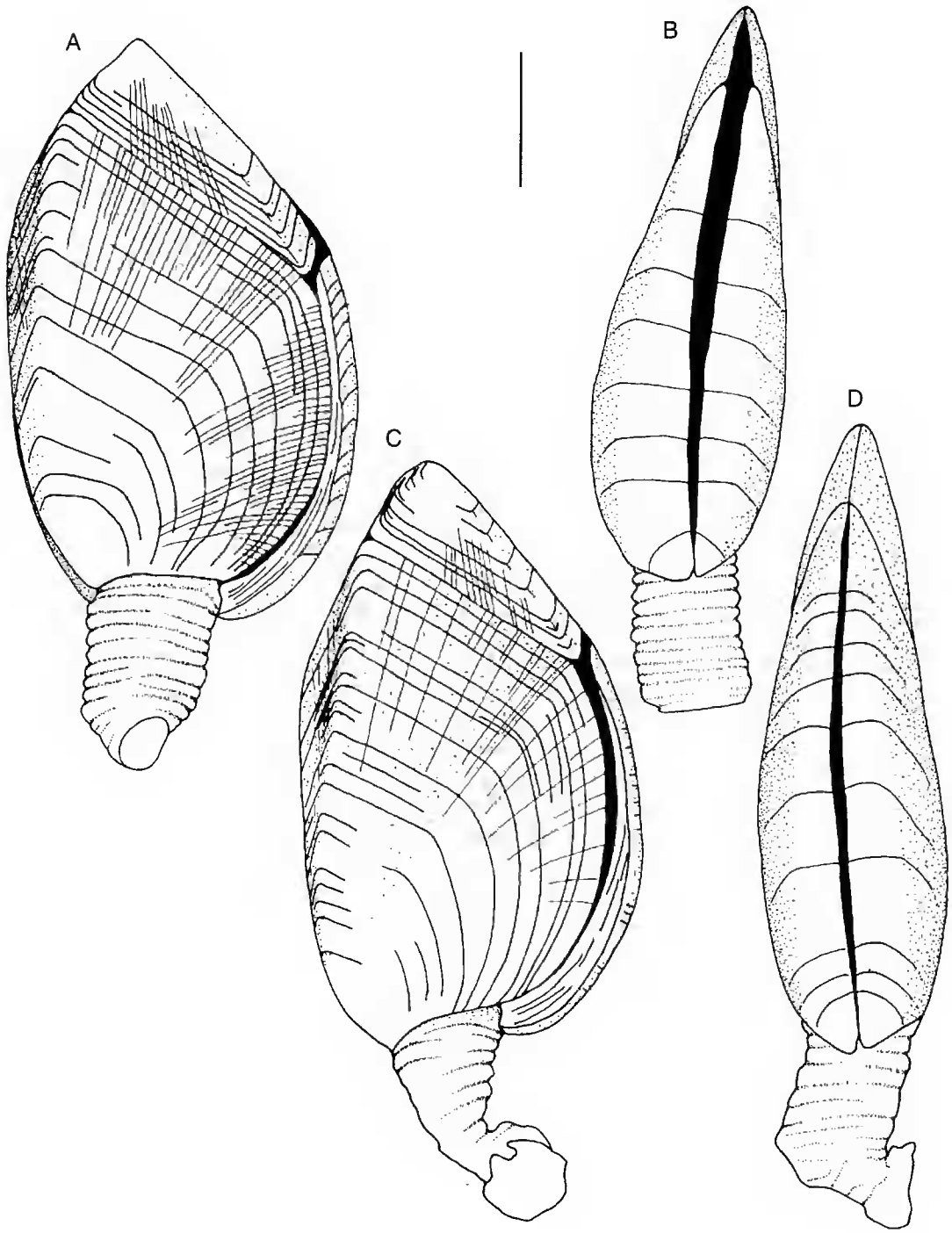

FIG. 1. — *Poecilasma inaequilaterale* Pilsbry, 1907; **A**, lateral view; **B**, rostral view (MNRJ 11397); *P. aurantia* Darwin, 1852; **C**, lateral view; **D**, rostral view (MNRJ 11379). Scale bar: 3 mm.

Genus *Glyptelasma* Pilsbry, 1907

Glyptelasma carinatum (Hoek, 1883)
(Fig. 2A-D)

Poecilasma carinatum Hoek, 1883: 44, pl. 1, figs 8-10, pl. 2, fig. 1, pl. 7, figs 7-8. – Weltner 1895: 289; 1897: 243. – Gruvel 1902b: 157, pl. 17, figs 9-16; 1905: 115, fig. 130. – Hoek 1907: 4, pl. 1, fig. 1; 1908: 111; 1914: 4. – Gruvel 1920: 37.
Megalasma (*Glyptelasma*) *carinatum* – Pilsbry 1907: 93. – Calman 1918: 401, figs 1-3; 1919: 370. – Barnard 1924: 54. – Zevina 1982: 92, fig. 82 [not *Megalasma carinatum*. – Foster 1978: 26, fig. 12 = *Glyptelasma hamatum* (Calman, 1919)].
Poecilasma (*Glyptelasma*) *carinatum* – Nilsson-Cantell 1921: 258.
Glyptelasma carinatum – Broch 1931: 32, fig. 11.

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 65 CB106, 23°54'S, 42°10'W, 830 m, 2.VI.1987, 3 specimens tl from 2.7 to 11.2 mm (MNRJ 11402).

REMARKS

The present specimens (Fig. 2A-D) have the basal margin of the carina continuous with the basal margin of the scutum, which uniformly curves toward the occludent margin. The carina is conspicuously wider in the lower third and has an internal band for attachment of the peduncle.
Glyptelasma carinatum (Hoek) is similar to *G. hamatum* (Calman), and both species are widely distributed. *Glyptelasma carinatum* has several filamentary appendages on the prosoma whereas *G. hamatum* has only one pair. The specimens identified by Foster (1978: 26) as *Megalasma carinatum*, had only a pair of filamentary appendages and therefore, they likely represent *G. hamatum* (Calman).
Most records of this species are from the Atlantic Ocean: Culebra Island (West Indies), Cuba, Azores, Cape Verde Islands, Ascension Island (Hoek 1883: 44; 1914: 4; Gruvel 1902b: 157; 1920: 37; Calman 1919: 370), and from South Africa (Barnard 1924: 54). Although, *G. carinatum* was cited from the Malay Archipelago and Japan (Nilsson-Cantell 1921: 258; Broch 1931: 32), neither Nilsson-Cantell nor Broch described the internal soft parts, and thus their identifications are questionable.

Suborder SCALPELLOMORPHA Newman, 1987
Family CALANTICIDAE Zevina, 1987

Genus *Scillaelepas* Seguenza, 1872

TYPE SPECIES. — *Scillaelepas carinata* (Philippi, 1835) [by original designation].

REMARKS

The genus *Scillaelepas* s.l. was recently divided into three genera: *Scillaelepas* s.s., *Aurivillialepas*, and *Gruvelialepas* (Newman 1980: 381). The differences are that *Scillaelepas* s.s. lacks a subrostrum, *Aurivillialepas* has one sub-rostrum, and *Gruvelialepas* has two subrostra. The presence or absence of a subrostrum results in a distinct form to the rostrum: *Scillaelepas s.s.* has a rostrum with a conspicuous median ridge, and *Aurivillialepas* and *Gruvelialepas* have a rostrum with a median groove for the subrostrum.
Thirty-two fossil species of *Scillaelepas* s.l. have been described, none of which have subrostra. All of the species were based on disarticulated shells. Generic assignment of those with a preserved rostrum may be inferred by the presence of a median ridge (*Scillaelepas* s.s.) or the median grooves (*Aurivillialepas* or *Gruvelialepas*). Because twenty of these species were described based on plates other than the rostrum, generic assignment badly deserves further investigations. They are as follows: *S. nilssoni* (Steenstrup, 1839), *S. valida* (Steenstrup, 1839), *S. gracilis* (Roemer, 1841), *S. zeidleri* (Reuss, 1864), *S. obsoleta* (Geinitz, 1875), *S. ginginensis* (Etheridge, 1913), *S. studeri* (Weltner, 1922), *S. belgica* (Withers, 1935), *S. bosqueti* (Withers, 1935), *S. brydonei* (Withers, 1935), *S. ifoensis* (Withers, 1935), *S. lanceolata* (Withers, 1935), *S. turonica* (Withers, 1935), *S. australensis* (Withers, 1953), *S. eocenica* (Withers, 1953), *S. blanchensis* (Buckeridge, 1983), *S. cardabia* (Buckeridge, 1983), *S. kendricki* (Buckeridge, 1983), *S. waitemata* (Buckeridge, 1983), *S. pittensis* (Buckeridge, 1984) (Weltner 1922; Withers 1935, 1953; Buckeridge 1983). Two species (*S. ornata* Seguenza, 1876 and *S. cazioti* Joleaud & Joleaud, 1913) (Seguenza 1876; Withers 1953) have a grooved rostrum, which suggests that they be assigned to

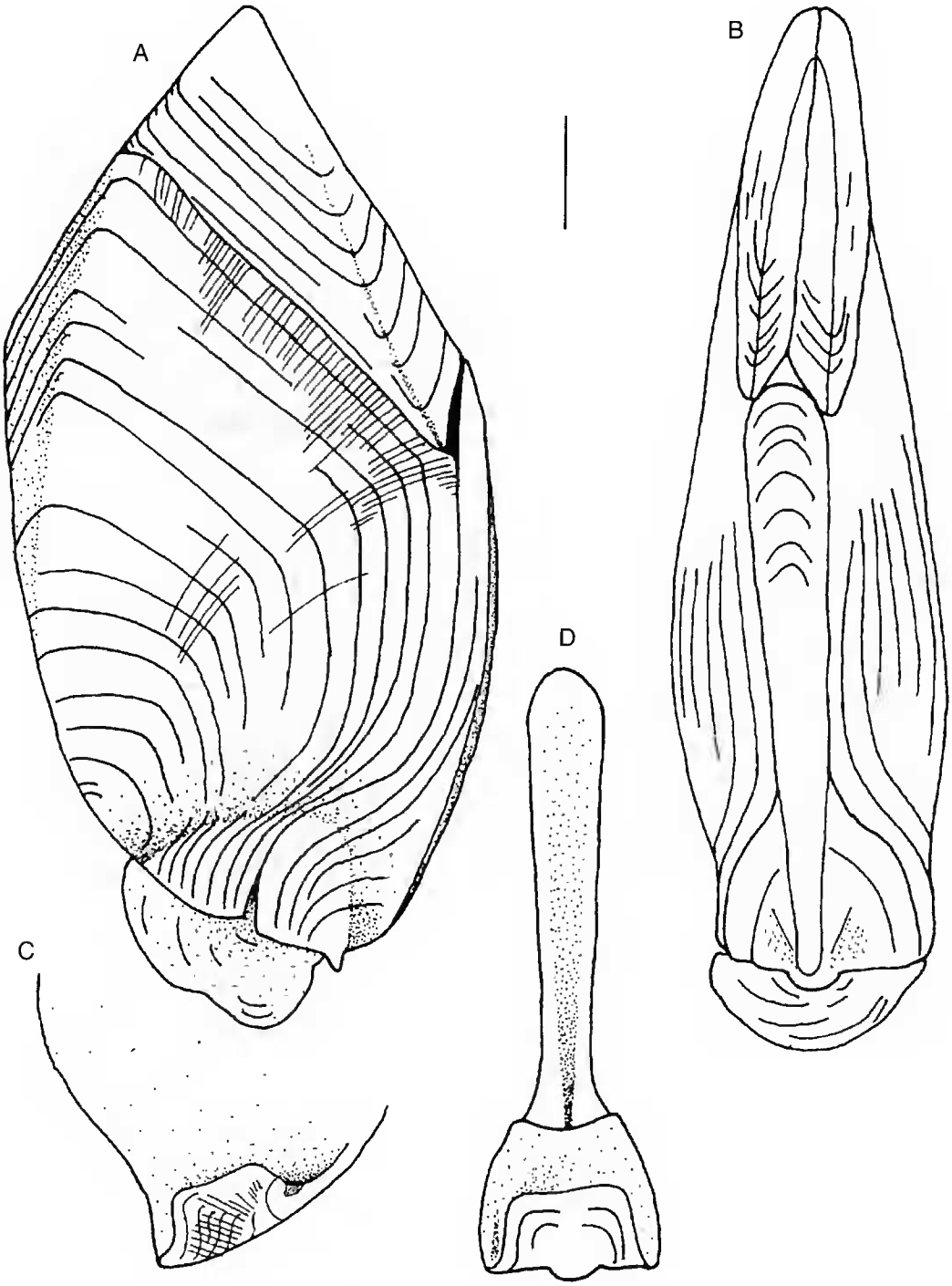

FIG. 2. — *Glyptelasma carinatum* (Hoek, 1883); **A**, lateral view; **B**, carinal view; **C**, rim of left scutum; **D**, inner view of carina (MNRJ 11402). Scale bar: 1 mm.

Aurivillialepas or *Gruvelialepas*. Two species (*S. conica* (Reuss, 1844) and *S. darwiniana* (Bosquet, 1854) (Withers 1935) have a rostrum with a very distinct height/width ratio, which is much larger than any other known species. Despite the fact that they have a slight median ridge, these likely represent other genera, rather than *Scillaelepas* s.l. The rostrum of *S. arguta* (Withers, 1924) and *S. ovalis* (Withers, 1928) are uniformly convex and lack ridges or grooves (Withers 1928, 1953; Buckeridge 1983). Thereby making generic identification uncertain. *Scillaelepas scanica* (Withers, 1935) has an eroded rostrum, but it appears to have a median ridge (Withers 1935). The remaining five species *S. carinata* (Philippi, 1835), *S. dorsata* (Steenstrup, 1839), *S. paronae* Alessandri, 1906, *S. angulata* (Withers, 1935), *S. caelata* (Withers, 1935) (Seguenza 1876; Alessandri 1906; Withers 1935, 1953) have a conspicuous median ridge, which suggests that they are related to the extant species of *Scillaelepas* s.s.

Therefore, herein I consider the following species to belong to the genus *Scillaelepas* s.s.: *S. carinata* (Philippi, 1835), *S. dorsata* (Steenstrup, 1839), *S. gemma* (Aurivillius, 1892), *S. grimaldi* (Aurivillius, 1898), *S. paronae* Alessandri, 1906, *S. superba* (Pilsbry, 1907), *S. angulata* (Withers, 1935), *S. caelata* (Withers, 1935), *S. fosteri* Newman, 1980, and *S. uschakovi* Zevina, 1988.

Two conspicuous characters can be used to distinguish these species: the striation pattern of the plates, especially that on the scutum, and the structure of the medial ridges. Most *Scillaelepas* have striae on the scutum, but they vary from slight to strongly striated forms. Most species also have the medial ridge, but in some species it is developed as a keel and in others as a flattened elevation. This last type of medial ridge may has fine striae on it.

The following new species are described based on isolated plates found in sediments dredged from 944-945 m. The plates are darkened but the features are well preserved.

Scillaelepas rhabdota n. sp.
(Fig. 3A-H)

MATERIAL EXAMINED. —TAAF MD55/Brazil 1987, *Marion Dufresne*, stn 29 DC49, 20°43'S, 31°56'W, 944-945 m, 19.V.1987, holotype: 1 right scutum (MNRJ 11381), pararypes: 1 right and 1 left scuta, 1 lefr tergum (MNHN-Ci2807), 1 left scutum, 2 left terga, 1 rostrum (MNRJ 11382).

ETYMOLOGY. — From the Greek *rhabdotos* (striped), referring to the strong radial striae on the plates.

DIAGNOSIS. — Plates with strong, radial striae. Tergum with straight apex. Rostrum evenly curving.

DESCRIPTION

Scutum (Fig. 3A-D) with flattened medial ridge, broadly widening basally; numerous, fine growth lines, intercalated by spaced, strong growth lines, and radial striae. Apex curved toward tergum. Occludent margin concave, tergal margin convex, basal margins forming obtuse angle tip of median ridge. Internally, with large, deep, round pit for adductor muscle.

Tergum (Fig. 3E-G) with median ridge and growth lines as in scutum, and numerous, conspicuous, radial striae near medial ridge. The surfaces separated by medial ridge of equal area. Apex straight. All margins straight, but basi-scutal margin is slightly convex. Basi-carinal margin longest, other margins almost equal in length.

Rostrum (Fig. 3H) evenly curving, wide at base, with numerous, strong growth lines; one strong, striated, medial ridge, widening broadly basally; fine, radial striae near the lateral margins.

REMARKS

The rostrum lacks a median groove, which suggests the absence of a subrostrum. Therefore, I include this species in the genus *Scillaelepas* s.s. (*sensu* Newman 1980: 381). The strong, striated pattern of the plates are only known in extant *S. gemma* (Aurivillius, 1892) and *S. fosteri* (Newman, 1980). The fossil species have plates that are finely striated or smooth.

S. gemma was recorded from the North Sea, East of Greenland, from 1800 m (Aurivillius 1894: 41). I could not observe any difference in the scutum and rostrum between this species and *S. rhabdota* n. sp., but the tergum is distinct. The tergum of *S. gemma* does not have any longitudinal striae, and it has a conspicuous curved apex, resulting in a convex occludent margin and concave carinal margin (Aurivillius 1894: 41).

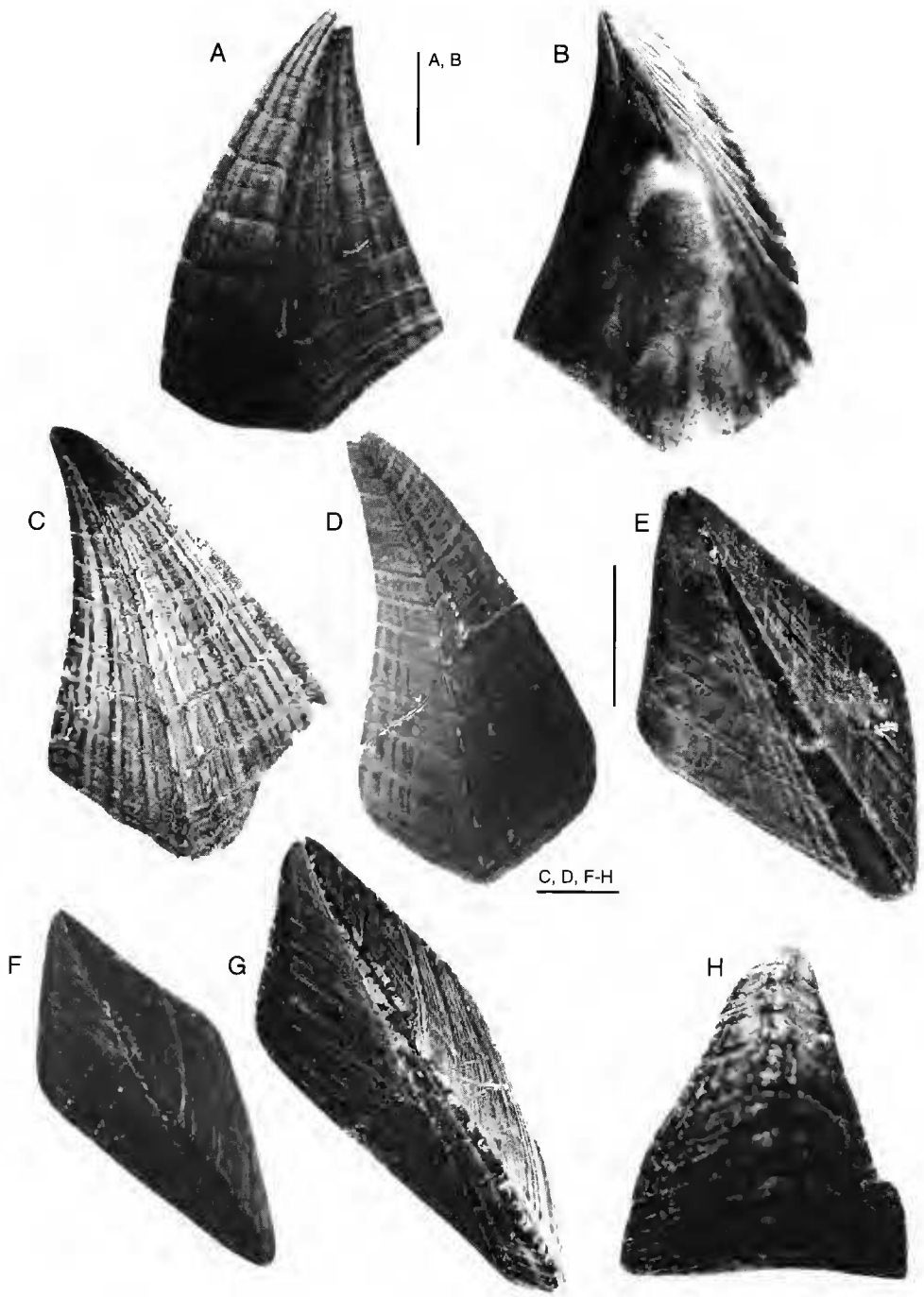

FIG. 3. — *Scillaelepas rhabdota* n. sp., holotype: **A**, outer view of scutum; **B**, inner view of scutum (MNRJ 11381); Paratypes: **C, D**, outer views of scuta; **E**, **F**, **G**, outer views of terga; **H**, outer view of rostrum; c, e, g, h (MNRJ 11382); d, f (MNHN-Ci2807). Scale bars: 3 mm.

S. fosteri was described from near Campbell, Bounty, and Antipodes Is., New Zealand, between 722 and 1075 m (Foster 1978: 47 as *Calantica gemma*; Newman 1980: 383). The plates have faint growth lines, and the rostrum is strongly curved (Foster 1978: 47; Newman 1980: 383).

S. gemma, *S. fosteri*, and *S. rhabdota* n. sp. are large species with a length of 37 mm, 24-43 mm, and 28-35 mm, respectively (based on the length of the scuta).

Scillaelepas brasiliensis n. sp.
(Fig. 4A-G)

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 29 DC49, 20°43'S, 31°56'W, 944-945 m, 19.V.1987, holotype: 1 right scutum (MNRJ 11383), paratypes: 2 right and 1 left scuta (MNHN-Ci2808), 1 left tergum, 1 rostrum, 1 carina (MNRJ 11384).

DIAGNOSIS. — Plates with fine, radial striae and with medial ridge. Tergum with scutal surface smaller than carinal.

DESCRIPTION

Scutum (Fig. 4A-D) with medial ridge; numerous, fine, growth lines, intercalated by spaced, wider ones, and fine, radial striae. Apex curved toward tergum. Occludent margin concave, tergal margin convex, basal margin nearly straight. Internally, with large, deep, round pit for adductor muscle.

Tergum (Fig. 4E) with medial ridge and growth lines as in scutum, without radial striae. Scutal surface smaller than carinal. Apex straight. All margins straight. Occludent margin smallest, other margins of almost equal length.

Rostrum (Fig. 4F) strongly convex, curving continuously; wide at base, with numerous, fine growth lines and strong, striated medial ridge.

Carina (Fig. 4G) curving continuously, with numerous, fine, conspicuous growth lines; with one strong medial ridge and strong bordering ridges; wide at base. Basal margin an open V-shape.

REMARKS

The species with finely striated plates are the extant *S. grimaldi* and *S. superba*, and the fossil species *S. carinata*, *S. dorsata*, and *S. angulata*.

S. grimaldi was recorded from the Azores between 845 and 1250 m (Gruvel 1920: 15). The carina is slightly curved; the rostrum has three ridges, and it is slightly convex, but strongly curved at the apex; the tergum has fine radial striae (Gruvel 1920: 15).

S. superba was dredged off North Carolina between 644 and 804 m (Pilsbry 1907: 11). The scutum has fine and well-developed radial striae; the tergum is equally divided by the medial ridge, and its apex is slightly curved; the carina has striae and does not have bordering ribs (Pilsbry 1907: 11; Newman 1980: 381).

S. angulata from the Upper Senonian (Cretaceous) of Sweden, has plates in different proportions than *S. brasiliensis* n. sp. The scutum is as high as wide; the length of the rostrum is twice its width; the width of the carina is one half its length. The scutum also has a very broad medial ridge and no bordering ribs (Withers 1935: 129).

S. dorsata from the Upper Danian (Paleocene) of Denmark, has broad medial ribs on the rostrum and tergum. The scutum and carina do not have any conspicuous medial ridge (Withers 1935: 100).

S. carinata from the Plio-Pleistocene of Italy, is similar to *S. brasiliensis* n. sp. There are similarities in the scutum and rostrum, but the carina of *S. carinata* has a thinner medial ridge and lacks a bordering ridge. The tergum is proportionally more slender, and its length almost three times its width (Withers 1935: 157).

Family SCALPELLIDAE Pilsbry, 1907
Subfamily MEROSCALPELLINAE Zevina, 1978
Genus *Neoscalpellum* Newman & Ross, 1971

Neoscalpellum debile (Aurivillius, 1898)
(Fig. 5A)

Scalpellum debile Aurivillius, 1898: 189. – Young 1998b: 36; 1999: 13, figs 10, 11 [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 38 CP63, 19°01'S, 37°29'W, 3442-3420 m, 25.V.1987, 1 specimen of 46 mm (MNRJ 11386).

REMARKS

The sole full grown specimen (Fig. 5A) has the

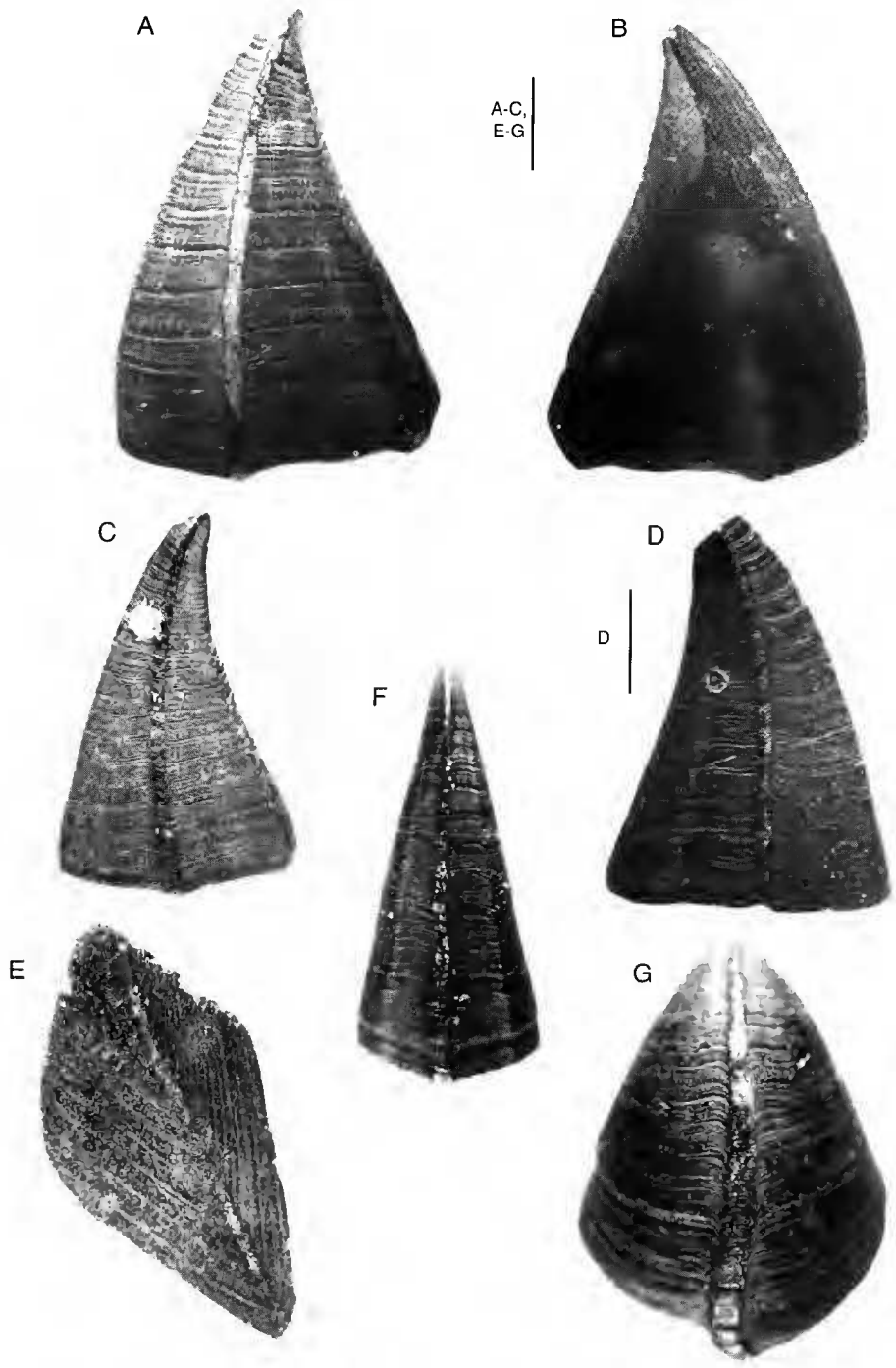

FIG. 4. — *Scillaelepas brasiliensis* n. sp.; holotype: **A**, outer view of scutum; **B**, inner view of scutum (MNRJ 11383); Paratypes: **C**, **D**, outer views of scuta (MNHN-Ci2808); **E**, outer view of tergum; **F**, outer view of carina; **G**, outer view of rostrum (MNRJ 11384). Scale bars: 3 mm.

capitular plates greatly reduced, similar to the plates of the specimens studied by Pilsbry (1907: 70, as *S. dicheloplax*), Gruvel (1920: 31), and Young (1999: 13).
Neoscalpellum debile has been recorded several times from the North Atlantic (Aurivillius 1898: 189; Gruvel 1920: 31; Newman & Ross 1971: 49; Zevina 1981: 159; Young 1998b: 36; 1999: 13) and only twice from the South Atlantic: off Tristan da Cunha and Angola (Foster & Buckeridge 1995: 173, as *Meroscalpellum bifurcatum* (Zevina)). This is the first record of this species from the southwestern Atlantic.

Subfamily ARCOSCALPELLINAE Zevina, 1978
Genus *Diceroscalpellum* Zevina, 1978

Diceroscalpellum boubalocerus (Young, 1992), n. comb.

Arcoscalpellum boubalocerus Young, 1992: 46, figs 5-7. – Young 1995: 243.

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 60 CB100, 22°59'S, 42°06'W, 33-45 m, 1.VI.1987, 1 specimen tl 25 mm USU (1325), 1 specimen tl 25 mm (MNHN-Ci2809).

REMARKS
The large specimens have their carino-latera projecting well beyond the carinal margin. This characteristic places this species in the genus *Diceroscalpellum* instead of *Arcoscalpellum*.

Genus *Trianguloscalpellum* Zevina, 1978

Trianguloscalpellum regium
(Wyville Thomson, 1873)
(Fig. 5B, C)

Scalpellum regium Wyville Thomson, 1873: 347 [part].
Trianguloscalpellum regium – Young 1999: 28, fig. 20, 22 [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 38 CP63, 19°01'S, 37°29'W, 3442-3420 m, 25.V.1987, 2 specimens tl 61 (MNRJ 11387), tl 27 mm (MNHN-Ci2810).

REMARKS
The carina has a roof flat with narrow lateral ribs, and its basal margin projects downward between the carino-latera, near the peduncle (Fig. 5C). Full-grown specimens have the typical carino-lateral which is significantly wider than high, but in smaller specimens it as high as wide (Fig. 5B). Furthermore, in the large specimen the tergum has two apico-basal ridges, as noted previously in full-grown specimens (Young 1998c: 111).

Genus *Amigdoscalpellum* Zevina, 1978

Amigdoscalpellum aurivilli (Pilsbry, 1907)
(Fig. 6A-D)

Scalpellum aurivilli Pilsbry, 1907: 64, fig. 26a-b, pl. 4, figs 9, 13, pl. 5, fig. 15. – Fowler 1912: 500. – Broch 1953: 7. – Zullo 1968: 211.
Scalpellum svetlanae Zevina, 1975: 241, fig. 3.
Arcoscalpellum aurivilli – Weisbord 1977: 267, pl. 27, fig. 1a, b.
Amigdoscalpellum aurivilli – Zevina 1978: 1349; 1981: 285, fig. 216,1.
Amigdoscalpellum svetlanae – Zevina 1978: 1349; 1981: 279, fig. 211.

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 38 CP63, 19°01'S, 37°29'W, 3442-3420 m, 25.V.1987, 1 specimen tl 18 mm (MNRJ 11394). — Stn 43 CB77, 19°00'S, 37°47'W, 900-790 m, 27.V.1987, 1 specimen tl 14 mm (MNHN-Ci2811).

REMARKS
Pilsbry (1907: 65) emphasized the position of the inframedian latus, which is not inserted between the carinal latera and rostral latus, but lies over the suture between these two plates. He depicted (fig. 26A) a situation where the inframedian is displaced and overlies the rostral latus. Zevina (1975: 241) described specimens with the inframedian latus displaced and overlying the carinal latus and used this to characterize her new species *A. svetlanae*. The displacement of this plate from one to another side is of little significance. Any change in the relative growth rate may account for the relative position of the inframedian latera.
The sole distinction between *A. aurivilli* and *A. svetlanae* is the rostrum. Pilsbry (1907: 65)

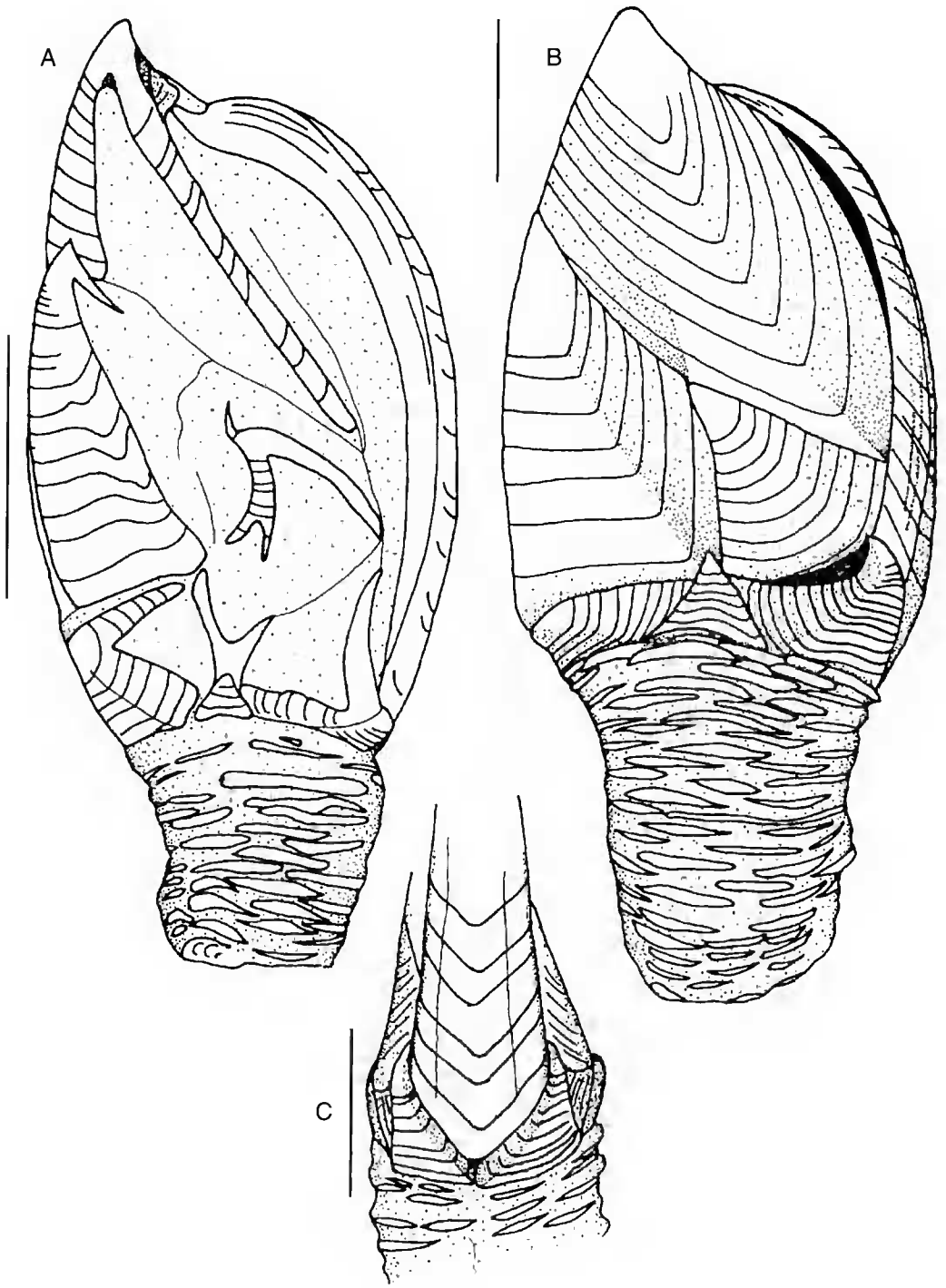

FIG. 5. — **A**, *Neoscalpellum debile* (Aurivillius, 1898), lateral view (MNRJ 11386); **B**, *Trianguloscalpellum regium* (Wyville Thomson, 1873), lateral view; **C**, detail of carinal view (MNRJ 11387). Scale bars: 10 mm.

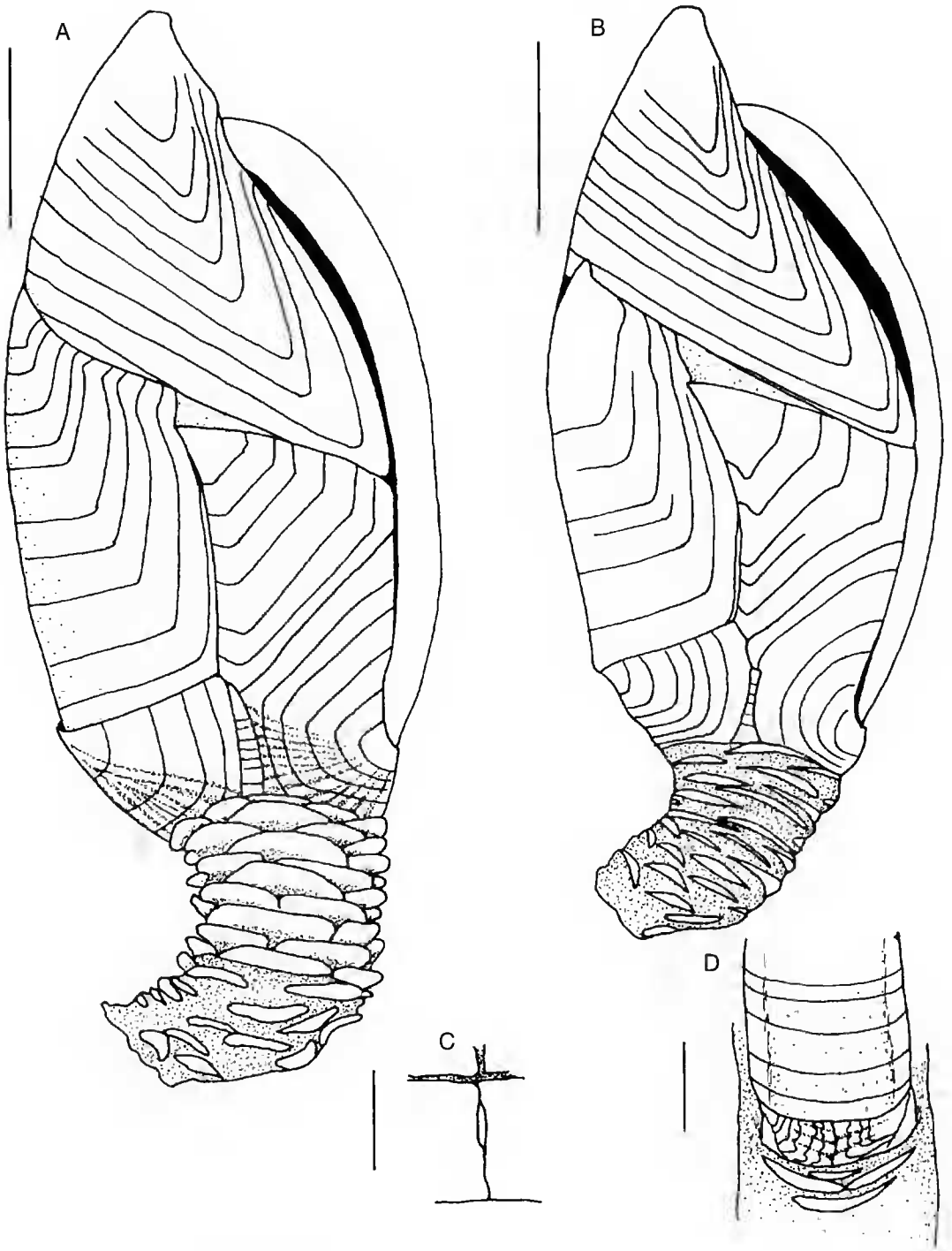

FIG. 6. — *Amigdoscalpellum aurivilli* (Pilsbry, 1907); **A**, lateral view (MNRJ 11394); **B**, lateral view; **C**, detail of rostral view; **D**, detail of carinal view (MNHN-Ci2811). Scale bars: A, B, 3 mm; C, D, 1 mm.

did not describe a rostrum whereas Zevina (1975: 241) observed a small one between the carinal latera (Fig. 6C). The specimens I have seen have an elongated rostrum hidden beneath the carinal latera. The capitular heights given by Pilsbry (1907: 65) and Zevina (1975: 241) and the specimen herein illustrated are respectively 24, 9, and 12 mm. Differences in rostrum development are likely due to the different stages of development.

The smaller specimen has the basal margin of the rostral lateta relatively broader than the short basal margin described by Pilsbry (1907: 65), with the bordering ribs of the carina low, and no ribs on the carinal latera (Fig. 6B). It was incubating approximately 20 large eggs. The larger specimen agrees with the description of Pilsbry (1907: 64), but has a costate surface also on the rostral latera, besides that on the carinal latera (Fig. 6A). The inframedian latus of this specimen is not as reduced as the smaller one, reaching the upper margins of the adjoining lateral plates.

The reduction in height of the inframedian latus is commonly observed during development in other species of *Amigdoscalpellum* (e.g., *A. rigidum* Aurivillius *in* Young 1999: 25).

Order SESSILIA Lamarck, 1818
Suborder VERRUCOMORPHA Pilsbry, 1916
Family VERRUCIDAE Darwin, 1854
Genus *Metaverruca* Pilsbry, 1916

Metaverruca recta (Aurivillius, 1898)
(Fig. 7A)

Verruca recta Aurivillius, 1898: 195.
Metaverruca recta – Buckeridge 1994: 116, fig. 13a-f [with synonymy]. – Young 1998b: 52 [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 02 CP1, 23°04'S, 40°20'W, 2370-2380 m, 8.V.1987, 1 specimen rc 4.4 mm (MNRJ 11393).

REMARKS

The specimen was attached to a mud concretion, an odd, unstable substrate. The tergum has the beginnings of an additional ridge, near the axial one (Fig. 7A), which is not common in this species.

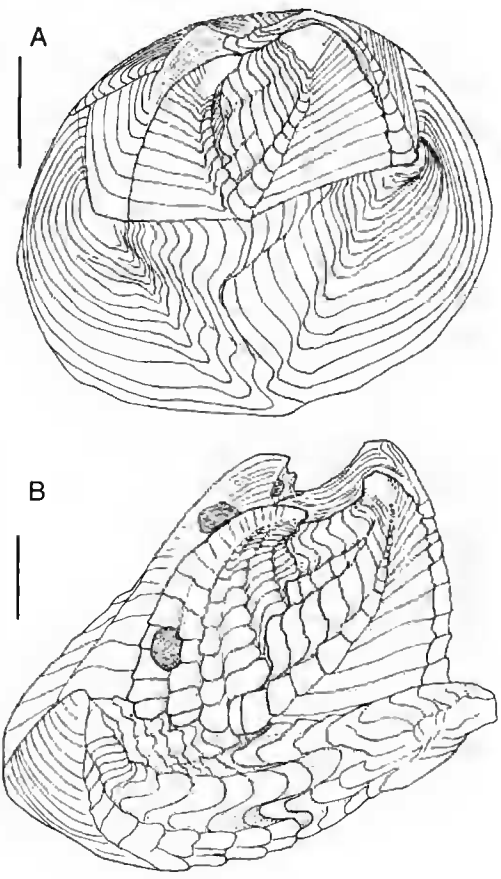

FIG. 7. — **A**, *Metaverruca recta* (Aurivillius, 1898), top view (MNRJ 11393); **B**, *Costatoverruca flavidula* (Pilsbry, 1916), top view (MNRJ 11380). Scale bars: 1 mm.

Genus *Costatoverruca* Young, 1998

Costatoverruca flavidula (Pilsbry, 1916)
(Fig. 7B)

Verruca calotheca flavidula Pilsbry, 1916: 34, pl. 5, fig. 2-2A. – Krüger 1940: 60. – Zullo 1968: 219. – Bayer *et al.* 1970: A43. – Weisbord 1979: 74, pl. 9, figs 1, 2. – Young 1993: 257. – Buckeridge 1994: 90.
Verruca (Verruca) calotheca flavidula – Nilsson-Cantell 1927: 772, fig. 13, pl. 1, fig. 6.
Verruca flavidul. – Young 1995: 245.
Newmaniverruca flavidula – Young 1998b: 77.

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 04 CP07, 21°31.4'S, 40°06.8'W, 750-785 m, 10.V.1987, 1 specimen fixed on calcareous base of crinoid rc 6.4 mm (MNRJ 11380). — Stn 56 CB96, 21°31'S, 40°08'W, 300-295 m, 31.V.1987, 1 specimen rc 3.3 mm (MNHN-Ci2812). — Stn 65 CB106, 23°54'S, 42°10'W, 830 m, 2.VI.1987, 2 specimens rc 2.5 and 2.6 mm (MNRJ 11403), 4 juveniles < 1.0 mm (USU 1326).

REMARKS

The ridges on the rostral side of the scutum appear early during the development of *C. flavidula*, but in juveniles (< 1 mm), this characteristic has not appeared. The small specimens (2.5 mm) have these ridges, but they are less developed than in the full-grown specimens (Fig. 7B).

C. flavidula was described by Pilsbry (1907: 34) as a subspecies of *Verruca calotheca*. The constancy of the wall plates between the specimens from Florida and Brazil justifies the recognition of this taxon as a full species, as did Young (1995: 245). Young (1998b: 77) situated *C. flavidula* in *Newmaniverruca*, but the presence of the secondary ridges on the rostrum places this species in the genus *Costatoverruca*.

Suborder BALANOMORPHA Pilsbry, 1916

Species indetermined
(Fig. 8A, B)

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 29 DC49, 20°43'S, 31°56'W, 944-945 m, 19.VI.1987, 1 carina (MNRJ 11385).

REMARKS

One carina was dredged between 944-945 m, together with the *Scillaelepas* spp. The solid wall has the alae with straight growth lines and fine radial striae (Fig. 8A, B). This pattern is not observed in any deep-sea species of balanomorphs from the Atlantic Ocean (*Pachylasma giganteum* (Philippi, 1836), *Bathylasma hirsutum* (Hoek, 1883), *Hexelasma americanum* Pilsbry, 1916) and from the Atlantic sector of the Antarctic region (*Tetrachaelasma southwardi* Newman & Ross, 1971, and *Bathylasma corolliforme* (Hoek, 1883)). These species present the growth lines curving near the margin of the alae.

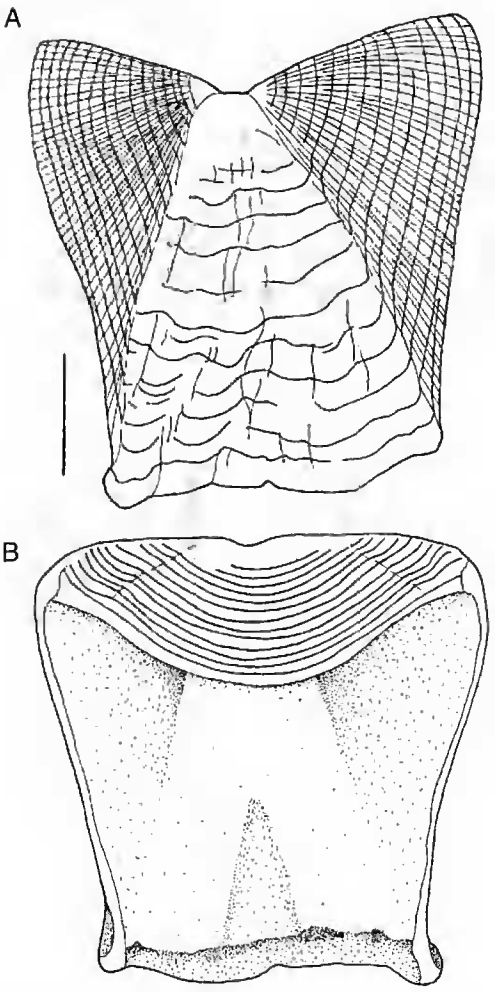

FIG. 8. — Balanomorpha species indetermined. Carina; **A**, outer view; **B**, inner view (MNRJ 11385). Scale bar: 3 mm.

Without additional samples I cannot identify this specimen to even family.

Superfamily CORONULOIDEA Leach, 1817
Family CORONULOIDAE Leach, 1817
Genus *Coronula* Lamarck, 1802

Coronula diadema (Linnaeus, 1767)

Lepas diadema Linnaeus, 1767: 1108.
Coronula diadema – Pilsbry 1916: 273, pl. 65, figs 3, 4 [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 02 CP1, 23°04'S, 40°20'W, 2370-2380 m, 8.V.1987, 8 plates (MNRJ 11378). — Stn 38 CP63, 19°01'S, 37°29'W, 3442-3420 m, 25.V.1987, 7 plates and several fragments (USU 1327). — Stn 39 CP68, 18°55'S, 37°49'W, 1200-1500 m, 26.V.1987, 1 shell and 12 plates rc 27.5 mm (MNHN-Ci2813); DC70, 18°59.1'S, 37°47.8'W, 1540-1550 m, 2 plates (USU 1328). — Stn 40 DC72, 19°00'S, 37°49'W, 950-1050 m, 27.V.1987, 2 plates (MNHN-Ci2819). — Stn 42 DC75, 18°59'S, 37°50'W, 295-315 m, 27.V.1987, 1 shell and 3 fragments rc 42.1 mm (USU 1329); CB76, 18°58'S, 37°49'W, 600-637 m, 2 plates (MNHN-Ci2820). — Stn 45 CB79, 19°01'S, 37°47'W, 1580-1575 m, 28.V.1987, 1 shell and 6 plates rc 50.5 mm (MNRJ 11396).

REMARKS

Coronula diadema has a world wide distribution, occurring on whales (Newman & Ross 1976: 45). It was previously recorded from Brazil on *Megaptera novaeangliae* (Borovski, 1781) (Young 1991: 194). A large number of shell plates were recorded between 23°S to 18°S, from depths of 295-3442 m, likely having fallen off whales in that area. The plates are in different stages of decomposition, including some that probably were recently detached.

Superfamily BALANOIDEA Leach, 1817
Family BALANIDAE Leach, 1817
Genus *Balanus* Costa, 1778

Balanus venustus Darwin, 1854

Balanus amphitrite var. *venustus* Darwin, 1854: 240, pls 5, 2a.
Balanus venustus – Henry & McLaughlin 1975: 164, fig. 30, pl. 21, fig. a-f [with synonymy].

MATERIAL EXAMINED. — TAAF MD55/Brazil 1987, stn 56 CB96, 21°31'S, 40°08'W, 300-295 m, 31.V.1987, 2 specimens and 2 shells rc 3.9 to 4.9 mm (USU 1330). — Stn 60 CB100, 22°59'S, 42°06'W, 33-45 m, 1.VI.1987, over 100 specimens and several shells rc up to 8.9 mm (MNHN-Ci2814); CB101, 22°58'S, 42°06'W, 50 m, 80 specimens and several shells rc up to 7.2 mm (USU 1331). — Stn 61 CB102, 23°07'S, 23°07'W, 100 m, 10 specimens rc 1.9 to 4.8 mm (MNHN-Ci2815).

REMARKS

Balanus venustus is a common species from the Brazilian continental shelf, occurring from the shallow infralittoral down to 100 m (Young 1994: 13, 1995: 230). The record from 300-295 m considerably extends its depth range.

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